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Quasi-one-dimensional Fulde-Ferrell-Larkin-Ovchinnikov-like state in Nb/Cu0.41Ni0.59 bilayers

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Abstract

In a ferromagnet (F) being in contact with a superconductor (S) an unconventional finite-momentum pairing of electrons forming Cooper pairs occurs. As a consequence, interference effects of the pairing wave function, leading to an oscillation of the critical temperature for increasing F-layer thickness in S/F bilayers, including extinction and recovery of the superconducting state, were predicted by theory. We observed experimentally all types of this behavior, calculated theoretically, in Nb/Cu1-xNix bilayers (x = 0.59) of nanometer film thickness, prepared by magnetron sputtering (utilizing a moving magnetron deposition technique to provide a superb homogeneity of the ultrathin Nb layers), including a double extinction of superconductivity, giving evidence for a multiple reentrant state. © Pleiades Publishing, Ltd., 2009.

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